**Satellite Remote Sensing of Near Real Time Coral Thermal Stress Metadata (200704)**

**Identification_Information:**
**Citation:**
**Citation_Information:**
**Originator: NOAA Coral Reef Watch NOAA National Environmental Satellite Data and Information Service**
**Publication_Date: 20060401**
**Title: Current satellite coral bleaching thermal stress monitoring global 50km HDF data file produced operationally in near-real-time by NOAA Coral Reef Watch**
**Edition: One**
**Geospatial_Data_Presentation_Form: remote sensing image and gridded data**
**Publication_Information:**
**Publication_Place: Suitland, Maryland, USA**
**Publisher: NOAA Coral Reef Watch**
**Online_Linkage: http://coralreefwatch.noaa.gov/satellite/hdf/index.html**
**Online_Linkage: http://coralreefwatch.noaa.gov/satellite/hdf/**
**Online_Linkage: http://coralreefwatch.noaa.gov/satellite/hdf/data/current/current_all.hdf**
**Description:**
**Abstract: This file contains a suite of NOAA Coral Reef Watch (CRW)'s most recent operational global satellite coral bleaching thermal stress monitoring raw data at 50km resolution produced twice-weekly in near-real-time. This HDF raw data file contains sea surface temperature (SST), SST anomaly, HotSpot, and Degree Heating Weeks (DHW) data. Satellite data from the Advanced Very High Resolution Radiometer (AVHRR) on NOAA's Polar Orbiting Environmental Satellite (POES) are used to generate AVHRR-SST. The most recent AVHRR data obtained from the POES that is presently in operational mode are processed to generate the near-real-time SSTs. The SST anomaly is the difference of SST compared to daily SST climatology. The coral bleaching HotSpot is a special type of sea surface temperature (SST) anomaly and shows the difference of SST compared to a coral bleaching SST threshold climatology. Only the positive anomalies (potential thermal stress inducing coral bleaching) are highlighted. DHW is the accumulation of Coral Bleaching HotSpots over a period of 12 consecutive weeks. The DHW value at any particular location at any particular time is the summation of the product of HotSpot values which are at least 1 deg C above the bleaching threshold SST and their durations in weeks (in minimum 0.5 week for our twice-weekly DHW) over the most recent 12-week period. One DHW is equivalent to 1 week of SST at 1 deg C above the threshold or 0.5 week of SST at 2 deg C above the threshold, etc. This data file is in Hierarchical Data Format Release 4 (HDF4) that is a commonly used data format. The data file are produced twice-weekly on every Tuesday (using AVHRR data from the previous Saturday through Monday) and on every Saturday (using AVHRR data from the previous Tuesday through Friday).**
**Purpose: The twice-weekly near-real-time global 50km satellite coral bleaching thermal stress monitoring products were primarily developed for NOAA's Coral Reef Watch (CRW) for both monitoring and assessment of coral bleaching.**
**Supplemental_Information: The SST chart created from this SST data is accessible at http://coralreefwatch.noaa.gov/satellite/current/key_sst_50km_field.html The SST anomaly chart created from this SST anomaly data is accessible at http://www.osdpd.noaa.gov/PSB/EPS/SST/climo.html The coral bleaching HotSpot chart created from this HotSpot data is accessible at http://www.osdpd.noaa.gov/PSB/EPS/SST/climohot.html**

The coral bleaching Degree Heating Weeks chart created from this Degree Heating Weeks data is accessible at
http://www.osdpd.noaa.gov/PSB/EPS/SST/dhw_retro.html
Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20010101
Ending_Date: present
Currentness_Reference: ground condition
Status:
Progress: Complete
Maintenance_and_Update_Frequency: none planned
Spatial_Domain:
Bounding_Coordinates:
West_Bounding_Coordinate: -180.0
East_Bounding_Coordinate: 179.5
North_Bounding_Coordinate: 85.0
South_Bounding_Coordinate: -80.0
Keywords:
Theme:
Theme_Keyword_Thesaurus: CoRIS Theme Thesaurus
Theme_Keyword: EARTH SCIENCE > Oceans > Ocean Temperature > Sea Surface Temperature > AVHRR
Theme_Keyword: EARTH SCIENCE > Oceans > Ocean Temperature > Water Temperature > Anomaly
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Coral Diseases > Bleaching > Bleaching HotSpot
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Coral Diseases > Bleaching > Degree Heating Week (DHW)
Theme_Keyword: EARTH SCIENCE > Oceans > Coastal Processes > Coral Reefs
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Monitoring and assessment
Theme_Keyword: EARTH SCIENCE > Biosphere > Zoology > Corals > Reef monitoring and assessment > Remote sensing > Satellite (digital scans) > AVHRR
Theme:
Theme_Keyword_Thesaurus: CoRIS Discovery Thesaurus
Theme_Keyword: Numeric Data Sets > Oceanography
Theme:
Theme_Keyword_Thesaurus: ISO 19115:2003 MD_TopicCategoryCode
Theme_Keyword: oceans
Theme_Keyword: 014
Theme:
Theme_Keyword_Thesaurus: none
Theme_Keyword: NOAA
Theme_Keyword: CoRIS
Theme_Keyword: Coral Reef Watch
Theme_Keyword: POES
Theme_Keyword: Polar Orbiting Environmental Satellite
Theme_Keyword: data
Theme_Keyword: oceanography
Theme_Keyword: physical oceanography
Theme_Keyword: biological oceanography
Theme_Keyword: marine ecosystem
Theme_Keyword: SST anomaly
Theme_Keyword: sea surface temperature anomaly
Theme_Keyword: HotSpot accumulation

Theme_Keyword: accumulation
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Theme_Keyword: stress
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Theme_Keyword: temperature anomaly
Theme_Keyword: coral bleaching HotSpot
Theme_Keyword: monitoring
Theme_Keyword: assessment
Theme_Keyword: remote sensing
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Theme_Keyword: AVHRR
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Theme_Keyword: temperature
Theme_Keyword: temperature anomaly
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Theme_Keyword: Degree Heating Week
Theme_Keyword: DHW
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Theme_Keyword_Thesaurus: ISO 19115:2003 MD_TopicCategoryCode
Theme_Keyword: oceans
Theme_Keyword: 014
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Place_Keyword: OCEAN BASIN > Pacific Ocean
Place_Keyword: OCEAN BASIN > Atlantic Ocean
Place_Keyword: OCEAN BASIN > Indian Ocean
Place:
Place_Keyword_Thesaurus: none
Place_Keyword: globe
Place_Keyword: ocean
Place_Keyword: global oceans
Temporal:
Temporal_Keyword_Thesaurus: none
Temporal_Keyword: real time
Temporal_Keyword: near real time
Temporal_Keyword: present
Temporal_Keyword: current
Access_Constraints: none
Use_Constraints: Not intended for legal use. Data may contain inaccuracies due to clouded or mixed pixels.
Point_of_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: NOAA Coral Reef Watch
Contact_Person: C. Mark Eakin, Coordinator, NOAA Coral Reef Watch
Contact_Address:
Address_Type: mailing and physical address
Address: NOAA E/RA31, SSMC1, Room 5308, 1335 East West Hwy
City: Silver Spring
State_or_Province: Maryland
Postal_Code: 20910-3226
Country: USA
Contact_Voice_Telephone: 301-713-2857 x 109
Contact_Facsimile_Telephone: 301-713-3136
Contact_Electronic_Mail_Address: coralreefwatch@noaa.gov, mark.eakin@noaa.gov

Browse_Graphic:
Browse_Graphic_File_Name:
http://coralreefwatch.noaa.gov/satellite/current/key_sst_50km_field.html
Browse_Graphic_File_Description: The browse images on these web pages are the graphic display of the data described in this metadata.
Browse_Graphic_File_Type: GIF
Browse_Graphic:
Browse_Graphic_File_Name: http://www.osdpd.noaa.gov/PSB/EPS/SST/climo.html
Browse_Graphic_File_Description: The browse images on these web pages are the graphic display of the data described in this metadata.
Browse_Graphic_File_Type: GIF
Browse_Graphic:
Browse_Graphic_File_Name: http://www.osdpd.noaa.gov/PSB/EPS/SST/climohot.html
Browse_Graphic_File_Description: The browse images on these web pages are the graphic display of the data described in this metadata.
Browse_Graphic_File_Type: GIF
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Browse_Graphic_File_Name:
http://www.osdpd.noaa.gov/PSB/EPS/SST/dhw_retro.html
Browse_Graphic_File_Description: The browse images on these web pages are the graphic display of the data described in this metadata.
Browse_Graphic_File_Type: GIF
Data_Quality_Information:
Attribute_Accuracy:
Attribute_Accuracy_Report: Polar Orbiting Environmental Satellite (POES) AVHRR-SST values are accurate
to within 0.5 degrees C and adjusted by in-situ information (buoys) to best-approximate SST at a depth of 1 meter. However, to provide a complete global coverage, estimation of SSTs at all pixels that are cloud covered may occasionally reduce the accuracy of SST at these pixels. The accuracy of the Degree Heating Weeks depends on the accuracy of Coral Bleaching HotSpots. No estimation on the HotSpots and SST anomalies has been done and only preliminary estimates exist for using DHWs to assess coral bleaching and mortality although they have demonstrated remarkable preliminary success in denoting most bleaching events.
Logical_Consistency_Report: none
Completeness_Report: Selected references:
1) The information for the AVHRR-derived sea surface temperature is described in the following guide.
Goodrum G., K. B. Kidwell, and W. Winston, 2000, NOAA KLM USER'S GUIDE. U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Environmental Satellite, Data, and Information Service, National Climatic Data Center, Climate Services Division, Satellite Services Branch, FOB3, Room G227, E/CC33, 5200 Auth Road, Suitland, MD 20746-4304, USA. This manual is available on line at http://www2.ncdc.noaa.gov/docs/klm/cover.htm. To request additional information contact: Telephone: (828) 271-4850, Telefax: (828) 271-4876, Email: satorder@ncdc.noaa.gov.
2) Strong, A. E., C. S. Barrientos, C. Duda, and J. Sapper, 1997: Improved Satellite Technique for Monitoring Coral Reef Bleaching. Proc 8th International Coral Reef Symposium 2:1495-1498. Available also online at URL http://www.osdpd.noaa.gov/PSB/EPS/SST/icrs_dud.html.
3) "New AVHRR Product -- Coral Reef Hotspots" by A. E. Strong and C. Duda, available at the URL http://www.osdpd.noaa.gov/PSB/EPS/SST/ashe_ab.html
4) Liu, G., W. Skirving, and A.E. Strong. 2003. Remote sensing of sea surface temperatures during 2002 Barrier Reef coral bleaching. EOS, 84(15), 137-144.

5) Skirving, W.J., A.E. Strong, G. Liu, C. Liu, F. Arzayus, J. Sapper and E. Bayler, Extreme events and perturbations of coastal ecosystems: Sea surface temperature change and coral bleaching. Chapter 2 in Remote Sensing of Aquatic Coastal Ecosystem Processes, L.L. Richardson and E.F. LeDrew (Co-Eds), Kluwer publishers, January, 2006.

Positional_Accuracy:
Horizontal_Positional_Accuracy:
Horizontal_Positional_Accuracy_Report: Users are referred to the following guide on AVHRR-derived sea surface temperature. Goodrum G., K. B. Kidwell, and W. Winston, 2000, NOAA KLM USER'S GUIDE. U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Environmental Satellite, Data, and Information Service, National Climatic Data Center, Climate Services Division, Satellite Services Branch, FOB3, Room G227, E/CC33, 5200 Auth Road, Suitland, MD 20746-4304, USA. This manual is available on line at http://www2.ncdc.noaa.gov/docs/klm/cover.htm. To request additional information contact: Telephone: (828) 271-4850, Telefax: (828) 271-4876, Email: satorder@ncdc.noaa.gov.
Vertical_Positional_Accuracy:
Vertical_Positional_Accuracy_Report: none
Lineage:
Source_Information:
Source_Citation:
Citation_Information:
Originator: NOAA Coral Reef Watch, NOAA/NESDIS
Publication_Date: 20000101
Title: NOAA Coral Reef Watch Operational Twice-Weekly Near-Real-Time Global 50km Satellite Coral Bleaching Degree Heating Weeks
Edition: one
Geospatial_Data_Presentation_Form: data file
Publication_Information:
Publication_Place: Suitland, Maryland, USA
Publisher: NOAA Coral Reef Watch
Type_of_Source_Media: data file
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20000101
Ending_Date: present
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Coral Bleaching Degree Heating Weeks
Source_Contribution: A copy of the source data is contained in this data file.
Source_Information:
Source_Citation:
Citation_Information:
Originator: NOAA Coral Reef Watch, NOAA/NESDIS
Publication_Date: 19970101
Title: NOAA Coral Reef Watch Operational Twice-Weekly Near-Real-Time Global 50km Satellite Coral Bleaching HotSpots
Edition: one
Geospatial_Data_Presentation_Form: data file
Publication_Information:
Publication_Place: Suitland, Maryland, USA
Publisher: NOAA Coral Reef Watch
Type_of_Source_Media: data file

Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19970101
Ending_Date: present
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Coral Bleaching HotSpots
Source_Contribution: A copy of the source data is contained in this data file.
Source_Information:
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Originator: NOAA Coral Reef Watch, NOAA/NESDIS
Publication_Date: 19970101
Title: NOAA Coral Reef Watch Operational Twice-Weekly Near-Real-Time Global 50km Satellite Nighttime AVHRR Sea Surface Temperature Anomalies
Edition: one
Geospatial_Data_Presentation_Form: data file
Publication_Information:
Publication_Place: Suitland, Maryland, USA
Publisher: NOAA Coral Reef Watch
Type_of_Source_Media: data file
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 20010101
Ending_Date: present
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Nighttime SST Anomalies
Source_Contribution: A copy of the source data is contained in this data file.
Source_Information:
Source_Citation:
Citation_Information:
Originator: NOAA Coral Reef Watch
NOAA/NESDIS
Publication_Date: 19970101
Title: NOAA Coral Reef Watch Operational Twice-Weekly Near-Real-Time Global Satellite Nighttime
AVHRR Sea Surface Temperatures
Edition: one
Geospatial_Data_Presentation_Form: data file
Publication_Information:
Publication_Place: Suitland, Maryland, USA
Publisher: NOAA Coral Reef Watch
Type_of_Source_Media: data file
Source_Time_Period_of_Content:
Time_Period_Information:
Range_of_Dates/Times:
Beginning_Date: 19970101
Ending_Date: present
Source_Currentness_Reference: ground condition
Source_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Nighttime AVHRR SSTs
Source_Contribution: A copy of the source data is contained in this data file.
Process_Step:

Process_Description: At each pixel, climatological sea surface temperature value is subtracted from AVHRR sea surface temperature value to produce sea surface temperature anomaly. Coral bleaching sea surface temperature threshold climatological value is subtracted from AVHRR sea surface temperature value to produce coral bleaching HotSpot value. Degree Heating Weeks are calculated as the accumulation of coral bleaching HotSpots over the most recent 12 weeks. The global satellite sea surface temperature, sea surface temperature anomaly, coral bleaching HotSpots, and coral bleaching Degree Heating Weeks are then stored in HDF format. Some references are listed below.
1) The information for the AVHRR-derived sea surface temperature is described in the following guide.
Goodrum G., K. B. Kidwell, and W. Winston, 2000, NOAA KLM USER'S GUIDE. U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Environmental Satellite, Data, and Information Service, National Climatic Data Center, Climate Services Division, Satellite Services Branch, FOB3, Room G227, E/CC33, 5200 Auth Road, Suitland, MD 20746-4304, USA. This manual is available on line at http://www2.ncdc.noaa.gov/docs/klm/cover.htm. To request additional information contact: Telephone: (828) 271-4850, Telefax: (828) 271-4876, Email: satorder@ncdc.noaa.gov.
2) Strong, A. E., C. S. Barrientos, C. Duda, and J. Sapper, 1997: Improved Satellite Technique for Monitoring Coral Reef Bleaching. Proc 8th International Coral Reef Symposium 2:1495-1498. Available also online at URL http://www.osdpd.noaa.gov/PSB/EPS/SST/icrs_dud.html.
3) "New AVHRR Product -- Coral Reef Hotspots" by A. E. Strong and C. Duda, available at the URL http://www.osdpd.noaa.gov/PSB/EPS/SST/ashe_ab.html
4) Liu, G., W. Skirving, and A.E. Strong. 2003. Remote sensing of sea surface temperatures during 2002 Barrier Reef coral bleaching. EOS, 84(15), 137-144.
5) Skirving, W.J., A.E. Strong, G. Liu, C. Liu, F. Arzayus, J. Sapper and E. Bayler, Extreme events and perturbations of coastal ecosystems: Sea surface temperature change and coral bleaching. Chapter 2 in Remote Sensing of Aquatic Coastal Ecosystem Processes, L.L. Richardson and E.F. LeDrew (Co-Eds), Kluwer publishers, January, 2006.

Source_Used_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Coral Bleaching Degree Heating Weeks

Source_Used_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Coral Bleaching HotSpots

Source_Used_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Nighttime AVHRR SSTs

Source_Used_Citation_Abbreviation: NOAA Coral Reef Watch Near-Real-Time Global Satellite Nighttime SST anomalies

Process_Date: 20010101

Process_Contact:
Contact_Information:
Contact_Organization_Primary:
Contact_Organization: NOAA Coral Reef Watch
Contact_Person: C. Mark Eakin, Coordinator, NOAA Coral Reef Watch
Contact_Address:
Address_Type: mailing and physical address
Address: NOAA E/RA31, SSMC1, Room 5308, 1335 East West Hwy
City: Silver Spring
State_or_Province: Maryland
Postal_Code: 20910-3226
Country: USA
Contact_Voice_Telephone: 301-713-2857 x 109
Contact_Facsimile_Telephone: 301-713-3136

Contact_Electronic_Mail_Address: coralreefwatch@noaa.gov, mark.eakin@noaa.gov
Spatial_Data_Organization_Information:
Direct_Spatial_Reference_Method: Raster
Raster_Object_Information:
Raster_Object_Type: Grid Cell
Row_Count: 331
Column_Count: 720
Spatial_Reference_Information:
Horizontal_Coordinate_System_Definition:
Geographic:
Latitude_Resolution: 0.5
Longitude_Resolution: 0.5
Geographic_Coordinate_Units: Decimal Degrees
Entity_and_Attribute_Information:
Detailed_Description:
Entity_Type:
Entity_Type_Label: Degree Heating Weeks grid cell
Entity_Type_Definition: 16-bit integer data elements in the coral bleaching Degree Heating Weeks data
Entity_Type_Definition_Source: self-evident
Attribute:
Attribute_Label: coral bleaching Degree Heating Weeks grid cell value
Attribute_Definition: The coral bleaching Degree Heating Weeks in the location indicated
by the pixel. In the Degree Heating Weeks data file, the units are in 100x degree Celsius-
weeks and the values are stored as integer.
Attribute_Definition_Source: Selected reference:
1) The information for the AVHRR-derived sea surface temperature is described in the following guide.
Goodrum G., K. B. Kidwell, and W. Winston, 2000, NOAA KLM USER'S GUIDE. U.S. Department of Commerce, National Oceanic and Atmospheric Administration National Environmental Satellite, Data, and Information Service, National Climatic Data Center, Climate Services Division, Satellite Services Branch, FOB3, Room G227, E/CC33, 5200 Auth Road, Suitland, MD 20746-4304, USA. This manual is available on line at http://www2.ncdc.noaa.gov/docs/klm/cover.htm. To request additional information contact: Telephone: (828) 271-4850, Telefax: (828) 271-4876, Email: satorder@ncdc.noaa.gov.
2) Strong, A. E., C. S. Barrientos, C. Duda, and J. Sapper, 1997: Improved Satellite Technique for Monitoring Coral Reef Bleaching. Proc 8th International Coral Reef Symposium 2:1495-1498. Available also online at URL http://www.osdpd.noaa.gov/PSB/EPS/SST/icrs_dud.html.
3) "New AVHRR Product -- Coral Reef Hotspots" by A. E. Strong and C. Duda, available at the URL http://www.osdpd.noaa.gov/PSB/EPS/SST/ashe_ab.html
4) Liu, G., W. Skirving, and A.E. Strong. 2003. Remote sensing of sea surface temperatures during 2002 Barrier Reef coral bleaching. EOS, 84(15), 137-144.
5) Skirving, W.J., A.E. Strong, G. Liu, C. Liu, F. Arzayus, J. Sapper and E. Bayler, Extreme events and perturbations of coastal ecosystems: Sea surface temperature change and coral bleaching. Chapter 2 in Remote Sensing of Aquatic Coastal Ecosystem Processes, L.L. Richardson and E.F. LeDrew (Co-Eds), Kluwer publishers, January, 2006.
Attribute_Domain_Values:
Range_Domain:
Range_Domain_Minimum: 0
Range_Domain_Maximum: 10000

Distribution_Information:
 Distributor:
  Contact_Information:
   Contact_Organization_Primary:
    Contact_Organization: NOAA Coral Reef Watch
    Contact_Person: C. Mark Eakin, Coordinator, NOAA Coral Reef Watch
   Contact_Address:
    Address_Type: mailing and physical address
    Address: NOAA E/RA31, SSMC1, Room 5308, 1335 East West Hwy
    City: Silver Spring
    State_or_Province: Maryland
    Postal_Code: 20910-3226
    Country: USA
   Contact_Voice_Telephone: 301-713-2857 x 109
   Contact_Facsimile_Telephone: 301-713-3136
   Contact_Electronic_Mail_Address: coralreefwatch@noaa.gov, mark.eakin@noaa.gov
 Distribution_Liability: NOAA makes no warranty regarding these data, expressed or implied, nor does
  the fact of distribution constitute such a warranty. NOAA cannot assume
  liability for any damages caused by any errors or omissions in these data,
  nor as a result of the failure of these data to function on a particular system.
 Standard_Order_Process:
  Digital_Form:
   Digital_Transfer_Information:
    Format_Name: HDF4 format
    Format_Information_Content: Sea surface temperature, sea surface temperature anomaly, bleaching HotSpots,
     and Degree Heating Weeks as remote sensing images and gridded data
   Digital_Transfer_Option:
    Online_Option:
     Computer_Contact_Information:
      Network_Address:
       Network_Resource_Name: http://coralreefwatch.noaa.gov/satellite/hdf/
       Network_Resource_Name: http://coralreefwatch.noaa.gov/satellite/hdf/data/current/current_all.hdf
     Access_Instructions: See web site http://hdf.ncsa.uiuc.edu/hdf4.html
    Offline_Option:
     Offline_Media: CD-ROM
     Recording_Format: none
     Compatibility_Information: HDF4 is commonly recognized data format. See web site http://hdf.ncsa.uiuc.edu/hdf4.html
  Fees: none
  Ordering_Instructions: The product in HDF4 format may be downloaded from the Web, FTP, and OPeNDAP site or obtained from the distributor.
Metadata_Reference_Information:
 Metadata_Date: 20060918
 Metadata_Contact:
  Contact_Information:
   Contact_Organization_Primary:
    Contact_Organization: NOAA Coral Reef Watch
    Contact_Person: C. Mark Eakin, Coordinator, NOAA Coral Reef Watch
   Contact_Address:
    Address_Type: mailing and physical address
    Address: NOAA E/RA31, SSMC1, Room 5308, 1335 East West Hwy
    City: Silver Spring
    State_or_Province: Maryland

Postal_Code: 20910-3226
Country: USA
Contact_Voice_Telephone: 301-713-2857 x 109
Contact_Facsimile_Telephone: 301-713-3136
Contact_Electronic_Mail_Address: coralreefwatch@noaa.gov, mark.eakin@noaa.gov
Metadata_Standard_Name: FGDC Content Standards for Digital Geospatial Metadata
Metadata_Standard_Version: FGDC-STD-001-1998